NCHRP REPORT 573

Superpave Mix Design: Verifying Gyration Levels in the N_{design} Table

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FOREWORD

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This report presents the findings of a research project to validate the gyration levels in the N_{design} table (Table 1) in AASHTO R 35 by following the behavior under traffic of a series of field projects. **Its main finding is that, based on ultimate pavement densities achieved on 40 field projects in 16 states across the United States, modest reductions in N_{design} are possible. Such reductions, if adopted, should lead to hot mix asphalt (HMA) mix designs that are more readily compacted in the field. The report will be of particular interest to materials engineers in state highway agencies, as well as to materials suppliers and paving contractor personnel responsible for the specification, design, and production of HMA.**

Table S.1. Proposed N_{design} levels for an SGC DIA of 1.16 ± 0.02 degrees

20-Year Design Traffic ESALs	2-Year Design Traffic ESALs	Ndesign for binders < PG 76-XX	Ndesign for binders ≥ PG 76-XX or mixes placed > 100 mm from surface
< 300,000	< 30,000	50	NA
300,000 to 3,000,000	30,000 to 230,000	65	50
3,000,000 to 10,000,000	230,000 to 925,000	80	65
10,000,000 to 30,000,000	925,000 to 2,500,000	80	65
> 30,000,000	> 2,500,000	100	80

Reducing N_{design} will tend to allow contractors to design mixes that can be more readily compacted in the field. This should improve in-place density. It may not, however, result in an increase in the

optimum asphalt content. **If the contractor were to use the same aggregate type and gradation, then VMA and the optimum asphalt content would increase with lower gyration levels.** However, most contractors would tend to adjust their gradations to reduce VMA, leaving some cushion above the minimum value, to produce a more economical mix. This cushion may tend to be slightly larger with lower N_{design} values. If a larger increase in optimum asphalt content is desired, the reduction in N_{design} should be accompanied by a small increase in minimum VMA. An increase in minimum VMA of 0.5 percent accompanied by the proposed reductions in N_{design} would tend to improve the compactability of the mix in the field and increase the optimum asphalt content.

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